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ABSTRACT

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Abstract

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TIMEOUT DURATION AND THE SUPPRESSION OF DEVIANT BEHAVIOR IN CHILDREN[1]

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Behavior modification in the natural environment frequently requires techniques to suppress the rate of deviant behavior. A popular and effective procedure is timeout from positive reinforcement (Patterson & White, 1969). This broad term refers to an arrangement in which the occurrence of a response is followed by a period of time in which a variety of reinforcers are no longer available. In practice, this typically involves placing the person in a small room which has been cleared of entertaining objects.

Some of the earliest demonstrations of timeout as a decelerating consequence come from animal studies where it has been shown to be effective in producing accuracy on a match-to-sample task through the suppression of incorrect responses (e.g., Ferster & Appel, 1961; Zimmerman & Ferster, 1963). In an extensive review of the animal literature,

Leitenberg (1965) concluded that there is evidence to support the notion that timeout serves as an aversive consequence. Subsequent to Leitenberg's review, timeout has continually been shown, both in animal studies (Azrin & Holz, 1966) and in experiments with humans (Willoughby, 1969; Bostow & Bailey, 1969; Hamilton, Stephen, & Allen, 1967), to be effective in suppressing a variety of behaviors.

Timeout has been extensively used to successfully manage deviant child behaviors such as assaultive acts of delinquent adolescents (Tyler, 1964), nonattending behavior in the classroom (Patterson, Ray, & Shaw, 1968), out-of-control behaviors in families of deviant children (Patterson, Cobb, & Ray, 1970), and certain classes of autistic behavior (Risley & Wolf, 1966).

When used with retarded children, timeout has been effectively used in programs to control aggressive behavior (Bijou, Birnbrauer, Kidder, & Tague, 1967; Hamilton, Stephen, & Allen, 1967), effect toilet training (Giles & Wolf, 1966), and to eliminate vomiting behavior (Wolf, Birnbrauer, Williams, & Lawler, 1965).

The question arises as to the most effective timeout duration. Timeout intervals of 2 minutes (Bostow & Bailey, 1969) to 3 hours (Burchard & Tyler, 1965) have been successful, but the comparison of different durations in populations of deviant children has received little attention. Timeout duration is an important variable for three reasons: (a) timeout removes the subject from the opportunity to learn desirable behavior and increases the cost of program time (Sailor, Guess, Rutherford, & Baer, 1968); (b) timeout durations which are too long or too short may increase the rate of deviant behavior; and (c) it is ethically questionable to subject anyone to unnecessary aversive experiences such as periods of timeout in excess of effective durations.

Experimental laboratory studies have demonstrated that intermediate timeout durations produce the most accurate match-to-sample behavior (Zimmerman & Ferster, 1963; Zimmerman & Baydan, 1963). When long timeout intervals were used, a generalized suppression effect was found to decrease both correct and incorrect responses. It is questionable, however, whether such results can be generalized to deviant children in natural environment settings. The primary objective of the present investigation was to study aspects of the duration dimension of timeout in a setting analogous to those in which timeout is typically employed.

A review of the literature on the use of timeout in the natural environment (Patterson & White, 1969) indicated that a majority of investigators reporting successful results used timeout durations in the range of 5 to 20 minutes. With this in mind, the investigators chose to examine the relative effectiveness of 1, 15, and 30 minutes, each delivered for every occurrence of deviant behavior. Two primary predictions were advanced: (a) the 15

minute condition would be equally or more effective than the 30 minute condition, and (b) the 15 and 30 minute durations would be superior to the 1 minute duration in the suppression of deviant behavior. The 1 minute condition was employed to serve as a control for such factors as staff attention, the walk to the timeout room, and any other nonspecific treatment effects. It also provided what seemed to be a reasonable lower limit timeout duration, though a lower timeout duration could certainly have been used.

It has been suggested that the combined use of timeout and positive reinforcement for incompatible, nondeviant behavior is superior to the use of either alone (Wolf, Risley, & Mees, 1964; Wahler, Winkel, Peterson, & Morrison, 1965; O'Leary, O'Leary, & Becker, 1967; Bostow & Bailey, 1969). While this may very well be the case, such a combination of procedures eliminates the possibility of studying the sole contribution of timeout in reducing deviant behavior. Therefore, no attempt was made in this study to systematically provide reinforcement for nondeviant behavior.

Method

Subjects and Setting

This study involved 20 moderately and severely retarded children, one-third of whom were female. These subjects were residents of a state operated institution for the retarded. Their ages ranged from 7 to 21 years, with a mean age of 11 years, 6 months.

The subjects were residents of a special "behavior cottage" living facility designed as a special location for children with severe and unmanageable behavior problems. Subjects were drawn from a population of several thousand residents of the institution. The cottage contained three dormatory rooms,

each of which could accomodate nine residents. All sleeping areas contained one timeout room, approximately 8 feet square, which was well illuminated and ventilated. All timeout rooms had observation windows and could be locked from the outside. In addition to the sleeping area, the cottage contained a dining room, bathrooms, and both indoor and outdoor recreation areas. The ratio of ward attendants to subjects was 1 : 7. In addition, there were nursing personel on the cottage and one of the experimenters was present during 50% of the daytime hours.

Procedures

Design. Subjects were randomly divided into three groups. Each group received the three timeout durations in a different order. That is, subjects in group A received 1 minute timeout for deviant behavior during the first two week timeout period. Later, this group received 15 minutes of timeout contingent upon deviant behavior, and in the third treatment period they received 30 minutes of timeout. Group B received a 30 minute, 1 minute, 15 minute sequence and group C received a 15 minute, 30 minute, 1 minute sequence. The repeated measures design was chosen to allow all subjects to receive each of the three timeout durations at some point in the investigation. These particular sequences were chosen so that each timeout duration was administered once in the first, second and third position (Winer, 1962).

There was an initial 6 week baseline period for all groups as well as baseline periods of 2 weeks following each timeout period. The purpose of this procedure was twofold: (a) the repeated reversal to baseline allowed for a clearer examination of the functional relationship between timeout and changes in deviant behavior, and (b) since each subject received more than one timeout duration the baseline periods were useful in minimizing systematic

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additive effects (i.e., sequence effects). The experimental design is represented in Table 1.

Insert Table 1 about here

Target behaviors. Before beginning any formal observation of the children, data were gathered by the ward personel on the behavior problems of the subjects. After several weeks of this procedure, a decision was collectively made by the experimenters and ward attendants as to which behaviors would be systematically tracked and recorded throughout the investigation. The following behaviors, considered to be the most disruptive to the smooth functioning of the ward and/or the most dangerous to the well-being of the residents and staff were selected for intervention:

1. Aggression: This behavior was defined as any physical assault on another individual. It includes hitting, kicking, biting, pinching, choking, and throwing objects at others.

2. Self-destruction: This behavior was defined as hitting parts of the body against walls and furniture, biting one's body, and other varieties of self-inflicted injury.

3. Tantrums: Temper tantrums was a heterogeneous class of simultaneously occurring behaviors which included such components as screaming, crying, thrashing about on the floor, occasional self-destructive acts, and lack of bowl and bladder control.

4. Running away: This behavior was defined as any unauthorized attempt to leave the ward or cottage. A frequent complaint of the cottage personel was that several children would frequently attempt to escape from the cottage. considerable time and expense was needed to locate some of these runaways.

Each of these behaviors was of the high amplitude, low frequency variety. For instance, while a given child exhibited perhaps only four aggressive or self-destructive responses per day, each act was often capable of inflicting severe injury, occasionally requiring hospitalization.

Baseline procedures. During baseline periods, the attendants were instructed to deal with deviant behavior in any way they wished, with the obvious restriction that timeout could not be used. This did not represent a gross change in ward routine in that timeout had a history of intermittent and infrequent use. During baseline periods, the attendants used such tactics as ignoring, threats, verbal reprimands, physical restraint and other means to deal with deviant behavior.

The frequency of deviant behavior was tabulated by the ward personel on 3 x 5 inch cards which contained the names of the subjects. These cards were turned in to one of the investigators at the end of the work shifts.

It was decided that several hours of reliability data would be collected during each week of the study. This procedure performed two functions: (a) the accuracy of the attendant's data collection could be monitored; (b) because recent investigations have revealed that observer reliability decreases very quickly following reliability checks (Reid, 1970), frequent reliability sessions could serve to attenuate this deterioration effect. Each observation session lasted 30 minutes, and data were collected in consecutive five minute blocks. During this time the second author placed himself within a particular ward and noted instances of deviant behavior. After the 30 minutes had elapsed, he would transfer the attendant's data onto his card. In this way, regular and rigorous surveillance was maintained and immediate feedback could be provided to unreliable aides.

Timeout procedures. The attendants were instructed to place subjects in timeout immediately following deviant behavior and to do so in a matter-of-fact manner without threat, apology, or comment. Recording sheets containing the names of all subjects were attached to each timeout room. These sheets allowed for the recording of the following information: timeout duration, deviant behavior leading to timeout, the time of day, subject's behavior while in timeout, and other pertinent comments. These sheets were collected at the end of each work shift and replaced by new ones. When all timeout rooms were occupied, deviant behavior was recorded but not followed by timeout. Attendants carried a small 3 x 5 inch card for recording instances of this nature.

Timers were attached to each timeout room and were set just after the subject was placed in timeout. In the case of the 1 minute duration, attendants used watches with second hands. When the prescribed duration had elapsed, the subject was quickly removed from timeout and returned, without comment, to the appropriate activity area. It was stressed that the subjects should be supervised as much as possible while in timeout. As a precaution against subjects remaining in timeout beyond the prescribed duration, each timing device was equipped with a 15 second duration buzzer which was audible throughout most of the cottage.

Results

Before analyzing observational data it is necessary to establish an acceptable level of observer reliability. On the average, four hours of reliability data were collected during each week of the investigation, and, over the course of the study, a total of 65 hours of reliability data were collected. The average reliability was 80%, computed as follows: For each 5 minute segment of each 30 minute reliability session, the number of

agreements and disagreements was found. Then total agreements were divided were divided by total agreements plus total disagreements. Five minute segments containing only zero entries were not included in the computation.

It was acknowledged that the attendants might collect the data more rigorously during reliability sessions. In order to get a measure of this type of bias, the rate of deviant behavior during reliability sessions was compared with the rate during periods when the investigators were absent. There was a minor, but insignificantly greater frequency of deviant behavior during reliability sessions.

In computing the rate of deviant behavior during the timeout phases of the investigation, it was necessary to adjust the data to take into account the time available to emit deviant responses. That is, each subject was observed for 16 hours each day. If, however, a subject spent several 30 minute periods in timeout, this time was subtracted from 16 hours, prior to computing the subject's rate of deviant behavior.

The results are presented both in terms of the group effects as well as for each individual subject. Figure 1 shows the mean rate of deviant behavior for each sequence condition during experimental and baseline periods. Table 2 presents the same data in terms of the percentage change in behavior rates from baseline to timeout periods. The possibility existed that percent change

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Insert Figure 1 and Table 2 about here

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was related to the baseline rates of behavior. A correlation was obtained, for each sequence condition, between the baseline rate of deviant behavior and the percentage change from baseline to timeout periods. Correlations of -.07,

-.12, and .06 were obtained for sequence A, B, and C respectively, indicating no relationship between these two variables.

The statistical analysis of timeout effects was computed on the basis of difference scores which were obtained for each subject. The mean rate of deviant behavior during a particular timeout period was subtracted from the mean rate of deviant behavior in the previous baseline period. An analysis of variance for repeated measures (Winer, 1962) was computed, indicating that timeout had a significant overall effect in reducing deviant behavior (F=15.3; df=1, 19; $p < .001$).

Group Results

Table 2 shows that 15 minutes of timeout produced an average decrease in deviant behavior of 37.16%; 30 minutes decreased deviant behavior by 34.20%; and, 1 minute resulted in an average increase of 12.09%. These findings indicate, at least in terms of group effects, that 30 minutes of timeout is no more effective in suppressing target behaviors than is 15 minutes.

A planned comparison (Hays, 1963, p. 474) between the 1 minute condition and the combined average of the 15 and 30 minute conditions approached significance (t=1.58, one tailed; df=19; $p < .07$), providing some support for the observation that 15 and 30 minutes were more effective than was 1 minute. There was one noticeable exception: Figure 1 and Table 2 reveals that 1 minute was particularly effective in suppressing the rate of deviant behavior when it was presented prior to other longer timeout durations.

The effect of timeout duration on the return to baseline levels of deviant behavior was also examined. No significant differences were found ($F < 1$; df=1, 19). A secondary issue of interest to the investigators concerned the differential effects of timeout according to the subject's social maturity

level. Each group was composed of several high and several low social maturity subjects, as measured by the Vineland Social Maturity Scale (Doll, 1947). This variable had no relationship to the effectiveness of timeout.

Individual Results

The question arises as to the representativeness of the group results with respect to the individuals treated.

Group A (1 minute - 15 minutes - 30 minutes). The subjects in this group, with one recurring exception, manifest effects similar to the group as a whole. It was clear, however, that the range of effects varied widely. For example, in the 1 minute phase, the degree of behavior change ranged from a 56.60% increase to a 93.10% decrease in deviant behavior, although only one subject in this group increased his rate of deviant behavior during timeout over the preceding baseline. This subject increased his rate in the periods in which 1 and 30 minute timeout durations were employed. In terms of percentage change in deviant behavior, there were 4 subjects who evidenced greater suppression in their rates of deviant behavior in the 30 minute as compared to the 15 minute condition. Three subjects in the 30 minute condition and 3 in the 15 minute condition showed greater suppression than under 1 minute of timeout.

Group B (30 minutes - 1 minute - 15 minutes). The most striking departure from the group effects for this sequence condition occurred with respect to the 1 minute duration. Table 2 shows that 1 minute effected an average increase in targeted behavior of 30.94%, yet it was clear that this result was largely due to two of the seven subjects in this condition. Moreover, for these same two subjects, 15 minutes also increased observed behavior over baseline rates. For another subject, 1 and 15 minutes were effective while 30 minutes slightly increased deviant behavior. For each of the three timeout durations, there was at least one subject where one of those durations increased deviant behavior.

Five of the seven subjects in this group showed greater suppression under 30 minutes of timeout when compared to the 15 minute condition. Four subjects in the 30 minute and two subjects in the 15 minute condition evidenced greater suppression than under 1 minute.

Group C (15 minutes - 30 minutes - 1 minute). As in group B, increases as well as decreases in deviant behavior exist in the three timeout durations. Four subjects in the 1 minute, two subjects in the 15 minute, and three subjects in the 30 minute phase evidenced increases. Two subjects in the 30 minute phase showed greater suppression than in the 15 and 1 minute condition. In addition, five subjects in the 15 minute condition showed greater suppression in deviant behavior over the 1 minute phase.

Of the 20 subjects in this study, there were nine for whom timeout produced increases in deviant behavior in at least one of the three durations. For one of these subjects, timeout was ineffective in all three durations; five subjects showed this effect in two durations, and three subjects showed it in one duration. There were, however, only two subjects where both 15 and 30 minutes increased target behaviors.

Discussion

The results of this study add to an extensive literature which demonstrates that timeout can be a generally effective means of controlling certain classes of unacceptable behavior (Bandura, 1969; Patterson & White, 1969; Kanfer & Phillips, 1970). However, as the results indicate, there were cases where this technique was an ineffective treatment procedure. How might this be accounted for? One consideration is the systematic use of positive reinforcement for competing, nondeviant behavior. This is a feature of most studies where timeout is employed. Wahler (1968) presents data demonstrating that the combined use of contingent reinforcement for prosocial behavior and timeout for deviant behavior is superior to the use of reinforcement and ignoring in reducing

"oppositional" behavior in young children. Walker, Mattson, and Buckley(1971) examined the components (praise, tokens, timeout) of an experimental classroom for unmanageable children and found that timeout was ineffective for one of their five subjects. However, they reported that timeout plus social reinforcement successfully managed the behavior of all subjects, lending support to Wahler's (1968) earlier finding.

Another general consideration relates to the observation that most successful applications of timeout reported in the literature have involved the results of case studies, usually involving only one subject. Since unsuccessful case studies are infrequently reported, information is lacking as to the number of times this procedure has failed. One exception to this generalization has been provided by Risley (1968), who found that timeout, combined with a reinforcement procedure, did not alter the dangerous climbing behavior of an autistic girl.

It should be pointed out again that the findings were obtained from a group of moderate to severely retarded children, and as such must be interpreted in the context of this population. The differences between timeout durations--the major focus of this study--might be a function of the ability to make certain temporal discriminations. It is possible that retarded differ from nonretarded subjects in this respect.

The relative effectiveness of 1, 15, and 30 minutes of timeout, when examined on a subject-by-subject basis, serves to restrain the generality of the findings reported in terms of group means. Nevertheless, two conclusions seem warranted: (a) Whether the data ~~was~~ were examined with respect to group averages or individual subjects, 15 minutes of timeout was as effective as 30 minutes in reducing deviant behavior. Four subjects increased deviant behavior over baseline levels under 15 minutes, while five subjects showed increases in the 30 minute conditions. (b) One minute of timeout was inferior to longer durations in its suppressive effect only when it followed them.

An interesting result can be observed with regard to the position in the sequence that 1 minute was presented. That is, when 1 minute was presented first, one subject increased his rate of deviant behavior; when it was presented second, two subjects showed increases; and, when it was presented as

the last timeout duration, four subjects increased their output of deviant behavior. This finding--the earlier 1 minute is used the greater its suppressive characteristics--is in accord with the group averages. Table 2 shows that 1 minute in the first position decreased deviant behavior by over 60%, 1 minute in the second position increased deviant behavior by 30%, and 1 minute in the last position increased deviant responses by over 60%. Similar sequence effects were not evident for the other durations, that is, as 15 or 30 minutes progresses from the first through the third position of presentation, there was no systematic or orderly change in their effectiveness.

The sequence effect concerning 1 minute of timeout is perhaps the most interesting finding of the investigation. It seems to argue for the use of very short timeout durations in applied settings particularly since one always has the option of increasing the duration if the short time interval proves ineffective.

Without the noticeable suppressive effects of 1 minute when presented first, the finding would not be nearly sointeresting. An alternative explanation for its effectiveness is that, perhaps, following a baseline period where punishment is relatively ineffective, the systematic disapproval conveyed to subjects as they were placed in timeout contributed to its effectiveness. This is consistent, in addition, with the observation that "...the initial appearance of punishment is especially effective not only because of its aversive properties but also because it constitutes such a dramatic stimulus change. It is well known that the sudden introduction of a novel stimulus per se will reduce responding" (Azrin & Holz, 1966, p. 394). One minute of timeout delivered after every deviant behavior might well qualify as a novel stimulus, especially in a population of subjects accustomed to sporadic and

inconsistent punishment. Given this interpretation one might expect the subject to adapt to the 1 minute timeout stimulus and to eventually increase deviant behavior. Such a novelty effect was not found in the present data, however, in that the rate of deviant behavior during the second week of the 1 minute condition (in the 1 minute - 15 minute - 30 minute sequence) was slightly lower than the rate of deviant behavior during the first week.

Sequence or context effects, where the presentation of one treatment influences the subsequent response to a second treatment, are both avoided as unwanted sources of error (Winer, 1962) as well as deliberately investigated as important phenomena in their own right (Bevan, 1968). Bevan and Adamson (1960) found differences among human subjects in performing an experimental task when a given level of reinforcement was preceded by high, medium, and low levels of the same reinforcer (shock). Baron (1970) has investigated the effects of an individual's previous reinforcement history on his current responsiveness to varying levels of reinforcement. In their extensive review of the punishment literature, Azrin and Holz (1966) report that prior experience with low levels of shock has a marked influence on the subsequent use of higher intensities. The results reported in this study add to a body of research literature demonstrating that the predictability of a behavior--or a technique used to change behavior--may well be a function of certain context factors, such as the sequence in which it occurs.

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Footnotes

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[2] This paper is based on a thesis submitted by the first author in partial fulfillment of the M. A. degree at the University of Oregon. Reprints may be obtained from Geoffry White, Oregon Research Institute, 488 11th Avenue East, Eugene, Oregon, 97403.

Table 1

Experimental Design Illustrating the Sequence of Baseline (BL) and Timeout (TO) Periods Experienced by Each of Three Groups

Groups	Periods						
Group A N = 6	BL 1[a]	TO 1 1 min.	BL 2	TO 2 15 min.	BL 3	TO 3 30 min.	BL 4
Group B N = 7	BL 1	TO 1 30 min.	BL 2	TO 2 1 min.	BL 3	TO 3 15 min.	BL 4
Group C N = 7	BL 1	TO 1 15 min.	BL 2	TO 2 30 min.	BL 3	TO 3 1 min.	BL 4

[a]BL 1 = 6 weeks; BL 2, 3, 4 and TO 1, 2, 3 = 2 weeks

Table 2

Percentage Change in Deviant Behavior from Baseline Periods to Timeout Periods for Each Sequence Condition

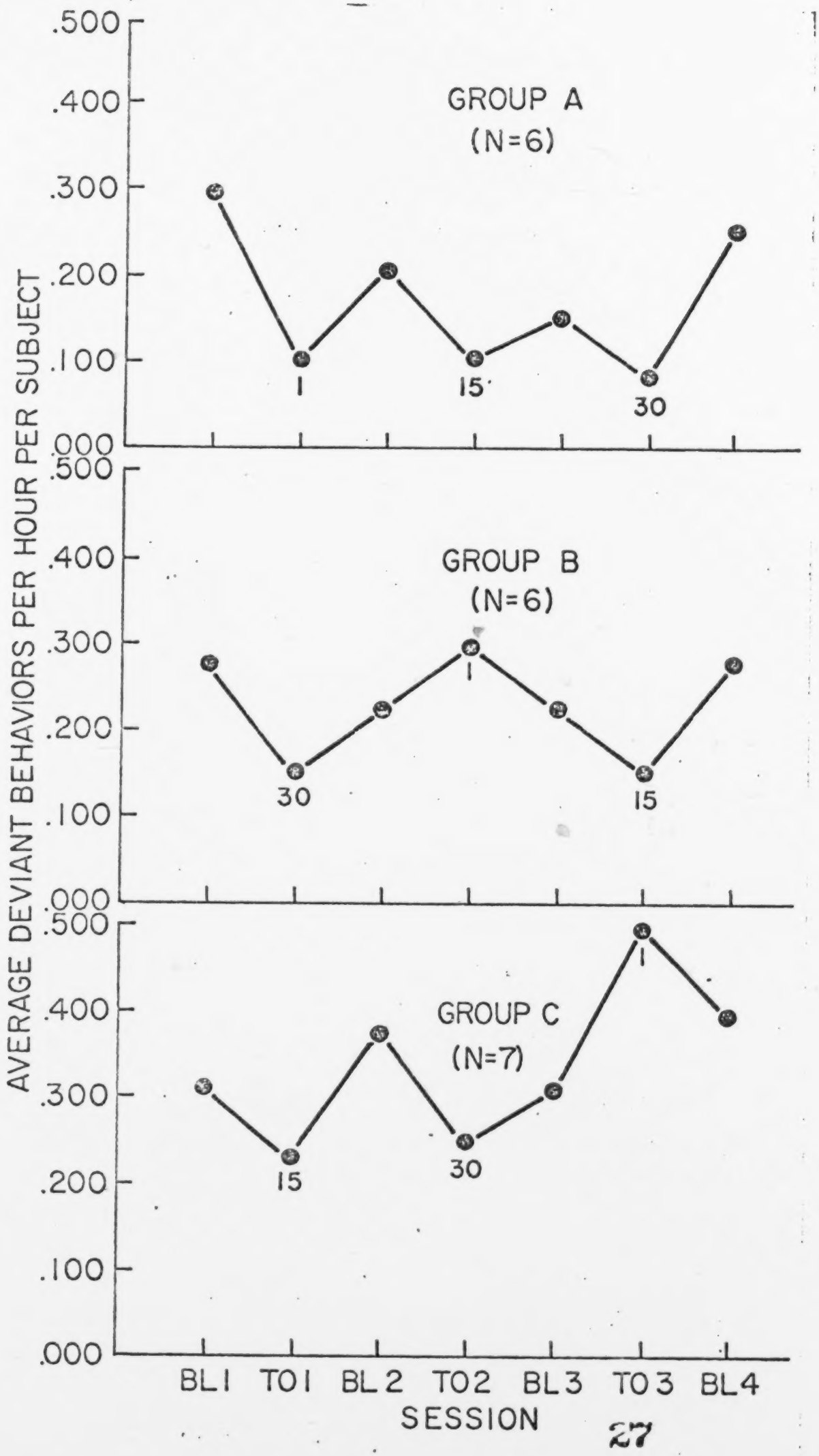
Group	Baseline 1 - Timeout 1	Baseline 2 - Timeout 2	Baseline 3 - Timeout 3
Group A (1-15-30)	1 min. -61.35	15 min. -53.27%	30 min. -40.29%
Group B (30-1-15)	30 min. -40.51	1 min. +30.94%	15 min. -31.25%
Group C (15-30-1)	15 min. -26.95	30 min. -21.80%	1 min. +66.67%

- = % decrease from previous baseline

+ = % increase from previous baseline

Figure Captions

1. Average deviant behaviors per hour per subject for each timeout sequence during timeout (TO) and baseline (BL) periods.


GROUP A
(N=6)
GROUP B
(N=6)
GROUP C
(N=7)
AVERAGE DEVIANT BEHAVIORS PER HOUR PER SUBJECT
.500
.400
.300
.200
.100
.000
1
15
30
BL1 TO1 BL2 TO2 BL3 TO3 BL4
SESSION